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w/Not. #6
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Superseding
CEGS-08110
(February 1986)
typed 1 Feb 94

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 84	(1991a) Surface Burning Characteristics of Building Materials
ASTM E 90	(1990) Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
ASTM E 152	(1981a) Fire Tests of Door Assemblies
ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

DOOR AND HARDWARE INSTITUTE (DHI)

DHI-02	(1986) Installation Guide for Doors and Hardware

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM HMMA 861	(1987) Hollow Metal Manual; Section: Guide Specifications for Commercial Hollow Metal Doors and Frames

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(1990) Fire Doors and Windows
NFPA 80A	(1987) Protection of Buildings from Exterior Fire Exposures
NFPA 101	(1991) Safety to Life from Fire in Buildings and Structures

STEEL DOOR INSTITUTE (SDOI)

SDOI SDI 100	(1991) Standard Steel Doors and Frames
SDOI SDI 106	(1991) Standard Door Type Nomenclature
SDOI SDI 107	(1984) Hardware on Steel Doors (Reinforcement - Application)

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-04 Drawings\

Doors and Frames\; *FIO*\.

Drawings shall use standard door type nomenclature in accordance with SDOI SDI 106 and shall indicate the location of each door and frame, elevation of each model of door and frame, details of construction, method of assembling sections, location and extent of hardware reinforcement, hardware locations, type and location of struts and anchors for frames, and thicknesses of metal. Drawings shall include catalog cuts or descriptive data for the weatherstripping including air infiltration data.

SD-09 Reports\

Fire Rated Doors\; *FIO*\.

In lieu of an Underwriters Laboratories, Inc. listing for fire doors assemblies, a letter shall be submitted by the testing laboratory which identifies the submitted product be manufacturer and type or model and certifies that it has tested a sample assembly and issued a current listing for same.

SD-13 Certificates\

Fire Rated Doors; GA.

Thermal Insulated Doors\; *FIO*\.

a. Certification of Thermal Insulating Rating: Certification or test report for thermal insulated doors shall show compliance with the specified requirements. The certification, or test report, shall list the parameters and the type of hardware and perimeter seals used to achieve the rating.

1.3 DELIVERY AND STORAGE

To provide protection during shipment, welded unit type frames shall be strapped together in pairs with heads at opposite ends or provided with temporary steel spreaders at the bottom of each frame. Materials shall be delivered to the site in undamaged condition, and stored out of contact with the ground and under a weathertight covering permitting good air circulation. Doors and assembled frames shall be stored in an upright position. Whenever damage becomes evident, abraded, scarred, or rusty areas shall be cleaned and touched up with the paint used for the shop painting.

PART 2 - PRODUCTS

2.1 DOORS AND FRAMES

Doors and frames, including borrowed light frame and removable mullion where indicated, shall be factory fabricated conforming to SDOI SDI 100 and the additional requirements specified herein. Door grade shall be heavy duty unless otherwise indicated on the door and door frame schedules. Frames shall be fabricated with mitered and welded corners. Exterior hollow metal doors and frames shall be galvanized. Doors and frames shall be prepared to receive hardware conforming to the templates and information provided under Section 08700 HARDWARE; BUILDERS' (GENERAL PURPOSE). Except where gasketing is indicated, rubber silencers shall be installed into factory predrilled holes in door frames; adhesively applied silencers are not acceptable. The Contractor shall coordinate between the hardware and door suppliers to assure that reinforcing of door assemblies for closers and other required hardware shall conform to SDOI SDI 100 and the conditions of the fire door assembly listing when applicable. Exterior doors shall have top and bottom edges closed flush and sealed against water penetration.

2.1.1 Weatherstripping

Unless otherwise specified in Section 08700 HARDWARE; BUILDERS' (GENERAL PURPOSE), weatherstripping shall be as specified below. Weatherstripping for head and jamb shall be manufacturers standard elastomeric type of synthetic rubber, vinyl, or neoprene and shall be installed at the factory or on the jobsite in accordance with the door frame manufacturer's recommendations. Weatherstripping for bottom of doors shall be as indicated in Specification Section 08700 Aluminum Housed Type Weather Seals. Air leakage rate of weatherstripping shall not exceed 0.20 cubic feet per minute per linear foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.2 FIRE RATED DOORS

Doors assemblies shall bear the listing identification label of the Underwriters Laboratories, Inc. or a nationally recognized testing laboratory qualified to perform tests of fire door assemblies in accordance with ASTM E 152 and having a listing for the tested assemblies. Listing identification labels shall be constructed and permanently applied by a method which results in their destruction should they be removed.

2.3 THERMAL INSULATED DOORS

All exterior doors shall be thermally insulated type. Interior of thermal insulated doors shall be completely filled with rigid foamed-in-place polyurethane or precured polystyrene foamed board, permanently bonded to each face panel. The U-value through the door shall not exceed 0.24. Doors with cellular plastic cores shall have a flame spread rating of not more than 75 and a smoke development factor of not more than 150 when tested in accordance with ASTM E 84.

PART 3 - EXECUTION

3.1 INSTALLATION

Installation shall conform to DHI-02, Installation Guide for Doors and Hardware. Steel doors and frames shall be reinforced, drilled, and tapped to receive mortised hinges, locks, latches, flush bolts, and closers as required. Preparation for hardware shall be in accordance with SDOI SDI 107. Weatherstripping shall be installed at exterior door openings to provide a weathertight installation. Installation and operational characteristics of fire doors shall conform to NFPA 80, NFPA 80A and NFPA 101.

3.2 THERMAL INSULATED DOORS

Hardware and perimeter seals shall be adjusted for proper operation.

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typed 7 Nov 94

SECTION 08120 - ALUMINUM DOORS AND FRAMES

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45	(1980) Designation System for Aluminum Finishes.

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 605.2	(1992) voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 209	(1992a) Aluminum and Aluminum-Alloy Sheet and Plate.
ASTM B 221	(1992a) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
ASTM E 330	(1990) Structural Performance of Exterior Windows, Curtain Walls,

and Doors by Uniform Static Air Pressure Difference.

1.2 SYSTEM DESCRIPTION

Swing-type aluminum doors and frames, of size and design shown on the drawings, shall be provided at the locations indicated. Doors shall be furnished complete with frames, trim and other accessories indicated and specified.

1.3 PERFORMANCE REQUIREMENTS

1.3.1 Vertical Rail Rotational Performance

Full-glazed doors, except doors with top and bottom rails fastened together with tensioned tie rods, shall pass the following test:

The test section shall consist of an assembly of the top corner of the door. The side-rail section shall be 24 inches long and the top-rail section shall be 12 inches long. The top-rail section of doors having tie rods extending between stiles shall have blocking at the section cut to provide anchorage for the tie rod. The top-rail section shall be anchored to the test bench so that the corner protrudes far enough to allow clearance for deflection of the side rail. A lever arm capable of supporting 190 pounds shall be attached to the side-rail section at a point 19 inches from the inside edge of the top-rail. Position of the lever arm shall be parallel to the top-rail section. A weight support pad shall be attached to the lever arm at a point 19 inches from the inner edge of the side rail. The test section shall withstand a load of 130 pounds on the lever arm before reaching the point of failure. Failure is defined as a joint separation of 1/16-inch during test loading or a vertical rail rotational displacement of 3-1/2 degrees during test loading.

1.3.2 Wind Load Performance

Doors shall be of sufficient strength to withstand a design wind load of 30 pounds per square foot of supported area with a deflection of not more than 1/175 times the length of the member. Doors shall be tested in accordance with ASTM E 330 at a pressure not less than 1.5 times the design load.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for

information only. The following shall be submitted in accordance with SECTION: 01300 - SUBMITTAL DESCRIPTIONS:

SD-01, Data\

Aluminum Doors and Frames\; *FIO*\.

Manufacturer's descriptive data and catalog cuts including air-infiltration data.

SD-04, Drawings\

Aluminum Doors and Frames\; *FIO*\.

A schedule showing the location of each door shall be included with the drawings. Drawings showing elevations of each door and frame type, details and method of anchorage, details of construction, location and installation of hardware, shape and thickness of materials, and details of joints and connections.

SD-06, Instructions\

Installation\; *FIO*\.

Cleaning\; *FIO*\.

Manufacturers installation instructions and cleaning instructions.

SD-09, Reports\

Full-Glazed and Flush Doors\; *FIO*\.

For full-glazed and flush doors, certified test reports stating that doors meet all test and specified requirements. Test shall be conducted by an independent testing laboratory within a period of 36 months preceding delivery of the doors to the site.

SD-14, Samples\

Finishes\; *GA*\.

Samples of the painted finish

1.5 DELIVERY AND STORAGE

Materials delivered to the jobsite shall be inspected for damage, and shall be unloaded with a minimum of handling. Storage shall be in a dry location with adequate ventilation, free from dust, water, and other contaminants, and which permits easy access for inspecting and handling. Materials shall be neatly stored on the floor, properly stacked on nonabsorptive strips or wood platforms. Doors and frames shall not be covered with tarps, polyethylene film, or similar coverings.

1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one-year period shall be provided.

PART 2 - PRODUCTS

2.1 ALUMINUM DOORS AND FRAMES

Extrusions shall comply with ASTM B 221, Alloy 6063-T5 except alloy used for anodized color coatings shall be required to produce the specified color. Aluminum sheets and strips shall comply with ASTM B 209, alloy and temper best suited for the purpose. Fasteners shall be hard aluminum or stainless steel.

2.1.1 Finishes

Finish shall be painted. Painted finish shall be manufacturer's standard fluoropolymer in accordance with the requirements of AAMA 605.2. Color shall be in accordance with the Door Schedule.

2.1.2 Welding and Fastening

Where possible, welds shall be located on unexposed surfaces. Welds required on exposed surfaces shall be smoothly dressed. Welding shall produce a uniform texture and color in the finished work, free of flux and spatter. Exposed screws or bolts will be permitted only at inconspicuous locations and shall have heads countersunk.

2.1.3 Anchors

Anchors shall be stainless steel or steel with a hot-dipped galvanized finish. Anchors of the sizes and shapes required shall be provided for securing aluminum frames to adjacent construction. Anchors shall be placed near top and bottom of each jamb and at intermediate points not more than 25 inches apart. The bottom of each frame shall be anchored to the floor construction with 3/32-inch thick stainless steel angle clips secured to the back of each jamb and to floor construction. Stainless steel bolts and expansion rivets shall be used for fastening clip anchors.

2.1.4 Provisions For Hardware

Hardware for aluminum doors is specified in SECTION: 08700 - BUILDERS' HARDWARE. Doors and frames shall be cut, reinforced, drilled, and tapped at the factory to receive template hardware. Reinforcement shall be provided in the core of doors as required to receive locks, door closers, and

other hardware. Doors to receive surface applied hardware shall be reinforced as required.

2.1.5 Provisions For Glazing

Glazing shall be as specified in SECTION: 08810 - GLASS AND GLAZING. Metal glazing beads, vinyl inserts, and glazing gaskets shall be provided for securing glass. Glass stops shall be tamperproof on exterior side.

2.1.6 Weatherstripping

Weatherstripping shall be continuous silicone-treated wool pile type, or a type recommended by the door manufacturer, and shall be provided on head and jamb of exterior doors. Weatherstripping for bottom of doors shall be as indicated. Weatherstripping shall be easily replaced without special tools, and shall be adjustable at meeting stiles of pairs of doors. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.2 FABRICATION OF ALUMINUM FRAMES

Frames shall be single-glazed. Frames shall be fabricated of extruded aluminum shapes to contours as shown on the drawings. Shapes shown are representations of design, function, and required profile. Dimensions shown are minimum. Shapes of equivalent design may be submitted, subject to approval of samples. Minimum metal wall thickness shall be 0.090-inch, except glazing beads, moldings, and trim shall be not less than 0.050-inch. Frames that are to receive glass shall have removable snap-on glass stops and glazing beads. Joints in frame members shall be milled to a hairline watertight fit, reinforced, and secured mechanically by steel clip arrangement or by screw spline attachment.

2.3 FABRICATION OF ALUMINUM DOORS

2.3.1 Sizes, Clearances, and Edge Treatment

Doors shall be not less than 1-3/4-inches thick. Clearances shall be 1/16-inch at hinge stiles, 1/8-inch at lock stiles and top rails, and 3/16-inch at floors and thresholds. Single-acting doors shall be beveled 1/8-inch at lock and meeting stile edges. 2.3.1.1

2.3.2 Full-Glazed Stile and Rail Doors

Doors shall have medium stiles and rails as shown, and shall be fabricated from extruded aluminum hollow seamless tubes or from a combination of open-shaped members interlocked or welded together. Doors shall be single-glazed. Top and bottom rail shall be fastened together by means of welding or by 3/8-inch diameter cadmium-plated tensioned steel tie rods. Extruded aluminum snap-in glazing beads shall be provided on interior side of doors. Extruded aluminum theft-proof snap-

in glazing beads or fixed glazing beads shall be provided on exterior or security side of doors. Glazing beads shall have vinyl insert glazing gaskets, designed to receive glass of thickness required. Glass is specified in SECTION: 08810 - GLASS AND GLAZING.

PART 3 - EXECUTION

3.1 INSTALLATION OF DOORS, FRAMES, AND ACCESSORIES

3.1.1 Protection of Aluminum

Aluminum shall not be used where it will be in contact with copper or where it will contact water which flows over copper surfaces. Aluminum that will be in contact with wet or pressure-treated wood, mortar, concrete, masonry, or ferrous metals shall be protected against galvanic or corrosive action by one of the following methods.

3.1.1.1 Paint

Aluminum surfaces to be protected shall be solvent cleaned and given a coat of zinc-molybdate primer and one coat of aluminum paint.

3.1.1.2 Nonabsorptive Tape or Gasket

Nonabsorptive tape or gasket shall be placed between the adjoining surfaces and shall be cemented to the aluminum surface using a cement compatible with aluminum.

3.1.2 Installation

Frames and framing members shall be accurately set in position to receive doors. Frames shall be plumb, square, level, and in alignment, and securely anchored to adjacent construction. Metal-to-metal joints between framing members shall be sealed as specified in SECTION: 07920 - JOINT SEALING. Doors shall be accurately hung with proper clearances, and adjusted to operate properly. Protective coverings if provided shall be removed and the doors and frames shall be thoroughly cleaned.

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(March 1989)
typed 10 Mar 95

SECTION 08201 - WOOD DOORS

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 152	(1981a) Fire Tests of Door Assemblies

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI-02	(1994) Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(1992) Fire Doors and Windows
NFPA 101	(1994) Safety to Life from Fire in Buildings and Structures

NATIONAL WOOD WINDOW & DOOR ASSOCIATION (NWWDA)

NWWDA I.S. 1-A	(1993) Architectural Wood Flush Doors

1.2 GENERAL REQUIREMENTS

1.2.1 Standard Products

Doors shall be of the type, size, and design indicated on the drawings, and shall be the standard products of manufacturers regularly engaged in the manufacture of wood doors.

1.2.2 Marking

Each door shall bear a stamp, brand, or other identifying mark indicating quality and construction of the door. The identifying mark or a separate certification shall include identification of the standard on which construction of the door is based, identity of the manufacturing plant, identification of the standard under which preservative treatment, if used, was made, and identification of the doors having a Type I glue bond.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-04 Drawings

Wood Doors; *FIO*.

Drawings indicating the location of each door, elevation of each type of door, details of construction, marks to be used to identify the doors, and location and extent of hardware blocking. Drawings shall include catalog cuts or descriptive data for doors, borrowed light frames, weatherstripping, and thresholds to be used.

SD-06 Instructions

Fire Doors; *FIO*.

Manufacturers preprinted installation instructions.

SD-13 Certificates

Fire Rated Doors; *GA*.

Certificates for oversize fire doors stating that the doors are identical in design, materials, and construction to a door that has been tested and meets the requirements for the class indicated.

SD-14 Samples

Wood Veneer for Field Finishing; *GA*

1.4 STORAGE

Doors shall be stored in fully covered areas and protected from damage and from extremes in temperature and humidity. Doors shall be stored on supports to prevent warping or twisting, and to provide ventilation. Factory cartons or wrappers shall be kept intact until installation.

1.5 HARDWARE

Hardware, including weatherstripping and thresholds, is specified in Section 08700 BUILDERS' HARDWARE.

1.6 GLAZING

Glazing is specified in Section 08810 GLASS AND GLAZING

1.7 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

PART 2 - PRODUCTS

2.1 GENERAL FABRICATION REQUIREMENTS

2.1.1 Edge Sealing

Wood end-grain exposed at edges of doors shall be sealed prior to shipment.

2.1.2 Adhesives

Adhesives shall be in accordance with NWWDA I.S. 1-A, requirements for Type II Bond Doors (water-repellent) for interior doors. Adhesive for doors to receive a transparent finish shall be nonstaining.

2.1.3 Prefitting

Doors shall be furnished prefitted or unfitted at the option of the Contractor.

2.1.4 Prehung Units

2.2 FLUSH DOORS

Flush doors shall be solid core and shall conform to NWWDA I.S. 1-A, except for the one year acclimazation requirement in paragraph T-2, which shall not apply. Wood doors shall be 5-ply or 7-ply construction with faces, stiles, and rails bonded to the cores.

2.2.1 Core Construction

2.2.1.1 Solid Cores

Door construction shall be glued wood block core or particle board core with faces, stiles and rails bonded to the core. Blocking and hardware reinforcements for particle board core doors shall be blocking option HB-1-5 in accordance with NWWDA I.S. 1-A.

2.2.1.2 Natural Finished Wood Veneer Doors

Veneer doors to receive natural finish shall be Custom Grade lauan veneer in accordance with NWWDA I.S. 1 A. Vertical stile strips shall be selected to provide edges of the same species as the face veneer. Door finish shall be in accordance with paragraph FIELD FINISHING.

2.3 FIRE RATED DOORS

Fire rated door assemblies shall bear the listing identification label of a nationally recognized testing laboratory qualified to perform tests of fire door assemblies in accordance with ASTM E 152 and having a listing for the tested assemblies. The specific time interval rating on the labels shall be as indicated. Door assemblies shall be in accordance with NFPA 80. Listing identification on labels shall be constructed and permanently applied by a method which results in their destruction should they be removed. Fire rated doors shall be mineral core 45 minute rating and particleboard core 20 minute rating.

2.3.1 Reinforcement Blocking

Fire rated doors shall be provided, as required, with hardware reinforcement blocking, and top, bottom, and intermediate rail blocking. Lock blocks shall be manufacturer's standard. Reinforcement blocking shall be in compliance with the manufacturer's labeling requirements. Reinforcement blocking shall not be of mineral material.

2.3.2 Stile Edges

Composite fire rated doors shall be provided with vertical stile edges that do not contain fire retardant salts. Vertical stiles shall be of the same species and/or color as the face veneer.

2.4 BORROWED LIGHT FRAMES IN FIRE DOORS

Manufacturer's standard frame formed of 18 gage cold rolled steel, factory primed and of design approved for use at assemblies of indicated fire resistance duration.

PART 3 - EXECUTION

3.1 INSTALLATION OF DOORS

3.1.1 General Use Doors

Doors shall be fit, hung, and trimmed as required. Door shall have a clearance of 1/8 inch at the sides and top and shall have a bottom clearance of 1/4 inch over thresholds and 1/2 inch at other locations unless otherwise shown. The lock edge or both edges of doors shall be beveled at the rate of 1/8 inch in 2 inches. Cuts made on the job shall be sealed immediately after cutting, using a clear varnish or sealer. Bottom of doors shall be undercut to allow clear door swing over carpeted areas. Vertical edges of doors which have not been rounded or beveled at the factory shall be eased when the doors are installed.

3.1.2 Fire Doors

Installation, hardware, and operational characteristics shall conform to NFPA 80 and NFPA 101 and shall be in strict conformance with the manufacturer's printed instructions. Properly sized pilot holes shall be drilled for screws in door edges. Factory applied labels shall remain intact where installed. Labeled hinge stile edge and top edge of door shall not be trimmed. Lockstile edge and bottom edge may be trimmed only to the extent recommended by the door manufacturer.

3.2 FIELD FINISHING

Doors to receive field finishing shall be factory primed or sealed, as required, and then shall be finished in accordance with Section 09900 PAINTING, GENERAL. Factory applied sealer shall not prevent doors from accepting field stain and finish. Color shall be as indicated.

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(December 1988)
typed 21 Feb 95

SECTION 08520 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45	(1980) Designation System for Aluminum Finishes

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 101	(1993) Voluntary Specifications for Aluminum Prime Windows and Sliding Glass Doors
AAMA 605.2	(1992; Addenda Feb 1994) Voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E 330	(1990) Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

ASTM E 547	(1986) Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(1994) Safety to Life from Fire in Buildings and Structures

1.2 WINDOW PERFORMANCE

Aluminum windows shall be designed to meet the following performance requirements. Testing requirements shall be performed by an independent testing laboratory or agency.

1.2.1 Structural Performance

Structural test pressures on window units shall be for positive load (inward) and negative load (outward) in accordance with ASTM E 330. After testing, there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanisms or any other damage which could cause window to be inoperable. There shall be no permanent deformation of any main frame, sash or ventilator member in excess of the requirements established by AAMA 101 for the window types and classification specified in this section.

1.2.2 Air Infiltration

Air infiltration shall not exceed the amount established by AAMA 101 for each window type when tested in accordance with ASTM E 283.

1.2.3 Water Penetration

Water penetration shall not exceed the amount established by AAMA 101 for each window type when tested in accordance with ASTM E 547.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-01 Data\

Aluminum Windows\; *FIO*\.

Manufacturer's descriptive data and catalog cut sheets.

SD-04 Drawings\

Aluminum Windows\; *FIO*\.

Drawings indicating elevations of window, rough-opening dimensions for each type and size of window, full-size sections, thicknesses of metal, fastenings, methods of installation and anchorage, connections with other work, type of wall construction, size and spacing of anchors, method of glazing, types and locations of operating hardware, mullion details, weatherstripping details, and window schedules showing locations of each window type.

SD-06 Instructions\

Aluminum Windows\; *FIO*\.

Manufacturer's preprinted installation instructions and cleaning instructions.

SD-09 Reports\

Aluminum Windows\; *FIO*\.

Reports for each type of aluminum window attesting that identical windows have been tested and meet all performance requirements established under paragraph WINDOW PERFORMANCE.

SD-13 Certificates\

Aluminum Windows\; *FIO*\.

Certificates stating that the aluminum windows are AAMA certified conforming to requirements of this section. Labels or markings permanently affixed to the window will be accepted in lieu of certificates.

SD-14 Samples\

Aluminum Windows\; *GA*\.

Manufacturer's standard color samples of the specified finishes.

1.4 QUALIFICATION

Window manufacturer shall specialize in designing and manufacturing the type of aluminum windows specified in this section, and shall have a minimum of 5 years of documented successful experience. Manufacturer shall have the facilities capable of meeting contract requirements, single-source responsibility and warranty.

1.5 DELIVERY AND STORAGE

Aluminum windows shall be delivered to project site and stored in accordance with manufacturer's recommendations. Damaged windows shall be replaced with new windows.

1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

PART 2 - PRODUCTS

2.1 ALUMINUM WINDOW TYPES

Aluminum windows shall consist of complete units including sash, glass, frame, weatherstripping and hardware. Windows shall conform to AAMA 101. Windows shall be single-glazed.

2.1.1 Fixed Windows

Aluminum fixed windows shall conform to AAMA 101 F C20 type, non-operable glazed frame, complete with provisions for reglazing in the field.

2.1.2 Projected Windows

Aluminum projected windows shall conform to AAMA 101 P C20 Designation type. Window ventilators shall be equipped with concealed four-bar friction hinges.

2.2 WEATHERSTRIPPING

Weatherstripping for ventilating sections shall be of type designed to meet water penetration and air infiltration requirements specified in this section in accordance with AAMA 101, and shall be manufactured of material compatible with aluminum and resistant to weather. Weatherstrips shall be factory-applied and easily replaced in the field.

Neoprene or polyvinylchloride weatherstripping are not acceptable where exposed to direct sunlight.

2.3 ACCESSORIES

2.3.1 Fasteners

Fastening devices shall be window manufacturer's standard design made from aluminum, non-magnetic stainless steel, cadmium-plated steel, nickel/chrome-plated steel or magnetic stainless steel in compliance with AAMA 101. Self-tapping sheet metal screws will not be acceptable for material thicker than 1/16 inch.

2.3.2 Hardware

Hardware shall be as specified for each window type and shall be fabricated of aluminum, stainless steel, cadmium-plated steel, zinc-plated steel or nickel/chrome-plated steel of quality established by AAMA 101.

2.3.3 Window Anchors

Anchoring devices for installing windows shall be made of aluminum, cadmium-plated steel, stainless steel, or zinc-plated steel conforming to AAMA 101.

2.4 GLASS AND GLAZING

Aluminum windows shall be designed for inside glazing, field glazing, and for glass types scheduled on drawings and specified in Section 08810 GLASS AND GLAZING. Units shall be complete with glass and glazing provisions to meet AAMA 101. Glazing material shall be compatible with aluminum, and shall not require painting.

2.5 FINISH

2.5.1 High Performance Coating

Exposed surfaces of aluminum windows shall be finished with a two coat fluoropolymer coating system containing at least 70 percent by weight polyvinylidene fluoride, PVF2 resin, factory applied, oven baked, conforming to AAMA 605.2, with a primer coat of 0.20 to 0.30 mils and a color coat of minimum 1.0 mils, total dry film thickness of 1.20 to 1.3 mils. Finish shall be free of scratches and other blemishes.

2.5.2 Color

Color shall match acrylic plaster finish (APL-1) Kelly cream base standard.

PART 3 - EXECUTION

3.1 INSTALLATION

Aluminum windows shall be installed in accordance with approved shop drawings and manufacturer's published instructions. Aluminum surfaces in contact with concrete, wood and dissimilar metals other than stainless steel, zinc, cadmium or small areas of white bronze, shall be protected from direct contact using protective materials recommended by AAMA 101. The completed window installation shall be watertight in accordance with Section 07920 JOINT SEALING. Glass and glazing shall be installed in accordance with requirements of this section and Section 08810 GLASS AND GLAZING.

3.2 ADJUSTMENTS AND CLEANING

3.2.1 Hardware Adjustments

Final operating adjustments shall be made after glazing work is complete. Operating sash or ventilators shall operate smoothly and shall be weathertight when in locked position.

3.2.2 Cleaning

Aluminum window finish and glass shall be cleaned on exterior and interior sides in accordance with window manufacturer's recommendations. Alkaline or abrasive agents shall not be used. Precautions shall be taken to avoid scratching or marring window finish and glass surfaces.

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SECTION 08700 - BUILDERS' HARDWARE

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA-01	(Effective thru Jun 1993) Directory of Certified Locks & Latches
BHMA-02	(Effective thru Jul 1993) Directory of Certified Door Closers
BHMA A156.1	(1988) Butts and Hinges
BHMA A156.3	(1989) Exit Devices
BHMA A156.4	(1986) Door Controls - Closers
BHMA A156.5	(1992) Auxiliary Locks & Associated Products

BHMA A156.6	(1986) Architectural Door Trim
BHMA A156.7	(1988) Template Hinge Dimensions
BHMA A156.13	(1987) Mortise Locks & Latches
BHMA A156.16	(1989) Auxiliary Hardware
BHMA A156.18	(1987) Materials and Finishes
BHMA A156.21	(1989) Thresholds

DOOR AND HARDWARE INSTITUTE (DHI)

DHI-02	(1986) Installation Guide for Doors and Hardware
DHI-03	(1989) Keying Systems and Nomenclature
DHI-05	(1990) Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames
DHI A115-W	(1988) Wood Door Hardware Standards (Incl A115-W1 thru A115-W9)

FEDERAL STANDARDS (FED-STD)

FED-STD 795	(Basic) Uniform Federal Accessibility Standards

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(1990) Fire Doors and Windows
NFPA 101	(1991) Safety to Life from Fire in Buildings and Structures
NFPA 105	(1989; Int Am 89-1) Installation of Smoke- and Draft-Control Door Assemblies

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for

information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-01, Data\

Hardware and Accessories\; *FIO*\.

Manufacturer's descriptive data, technical literature, catalog cuts, and installation instructions. Spare parts data for locksets, exit devices, and closers, after approval of the detail drawings, and not later than 3 month(s) prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

SD-07, Schedules\

Hardware Schedule\; *FIO*\.

Hardware schedule listing all items to be furnished. The schedule shall include for each item: the ANSI or BHMA item type identification number, where available; the quantities; manufacturer's name and catalog numbers; sizes; detail information or catalog cuts; finishes; door and frame size and materials; location and hardware set identification cross-references to drawings; lock trim material thicknesses; lock trim material evaluation test results; corresponding reference standard type number or function number from manufacturer's catalog if not covered by ANSI or BHMA; and list of abbreviations and template numbers.

Keying Schedule\; *GA*\.

Keying schedule developed in accordance with DHI-03, after the keying meeting with the user.

SD-13, Certificates\

Hardware and Accessories\; *FIO*\.

The material supplier's or hardware manufacturer's certificates of compliance stating that the supplied material or hardware item meets specified requirements. Each certificate shall be signed by an official authorized to certify in behalf of material supplier or product manufacturer and shall identify quantity and date or dates of shipment or delivery to which the certificates apply. A statement that the proposed hardware items appear in BHMA-01 and BHMA-02 directories of certified products may be

submitted in lieu of certificates. A separate Certificate of Compliance attesting that hardware items conform to the "Buy American Act" shall be included.

SD-14 Samples\

Locksets\; *GA*\.

Furnish a sample of the locksets to be furnished this project. Notify the Contracting Officer and base personnel for a meeting demonstrating that the locksets to be furnished are fully compatible with the existing keying system. An existing base core, cylinder, and key will be fitted to the sample lockset. The core and cylinder shall fit the lockset without the use of adaptors and without play. The key shall easily lock and unlock the lockset without binding or other difficulties. Control key shall easily remove and install cores.

SD-19, Operation and Maintenance Manuals\

Hardware and Accessories\; *FIO*\.

Six complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions for electric locks, electric strikes, electro-magnetic closer holder release devices, and electric exit devices shall include simplified diagrams as installed.

1.3 DELIVERY, STORAGE, AND HANDLING

Hardware shall be delivered to the project site in the manufacturer's original packages. Each article of hardware shall be individually packaged in the manufacturer's standard commercial carton or container, and shall be properly marked or labeled to be readily identifiable with the approved hardware schedule. Each change key shall be tagged or otherwise identified with the door for which its cylinder is intended. Where double cylinder functions are used or where it is not obvious which is the key side of a door, appropriate instructions shall be included with the lock and on the hardware schedule. Manufacturer's printed installation instructions, fasteners, and special tools shall be included in each package.

1.4 SPECIAL TOOLS

Special tools, such as those supplied by the manufacturer, spanner and socket wrenches, and dogging keys, shall be provided as required to adjust hardware items.

PART 2 - PRODUCTS

2.1 GENERAL HARDWARE REQUIREMENTS

Hardware shall conform to the requirements specified herein and the HARDWARE SETS listing at the end of this section. Hardware set numbers correspond to the set numbers shown on the drawings. Hardware items providing accessibility and usability for physically handicapped shall comply with FED-STD 795.

2.2 TEMPLATES

Requirements for hardware to be mounted on metal doors or metal frames shall be coordinated between hardware manufacturer and door or frame manufacturer by use of templates and other information to establish location, reinforcement required, size of holes, and similar details. Templates of hinges shall conform to BHMA A156.7.

2.3 HINGES

Hinges shall conform to BHMA A156.1. Hinges used on metal doors and frames shall also conform to BHMA A156.7. Except as otherwise specified, hinge sizes shall conform to the hinge manufacturer's printed recommendations.

2.3.1 Hinges for Reverse Bevel Doors with Locks

Hinges for reverse bevel doors with locks shall have pins that are made nonremovable by means such as a set screw in the barrel, or safety stud, when the door is in the closed position.

2.4 LOCKS AND LATCHES

To the maximum extent possible, locksets, latchsets and deadlocks shall be the products of a single manufacturer. Lock and latch set trim (knobs, handles, roses and escutcheons) shall be of a simple design in accordance with manufacturer's standard practice. Locksets and latchsets shall have lever or U-shaped handles. Lever handles shall have a return of at least 1/4-inch.

2.4.1 Mortise Lock and Latchsets

Mortise lock, latchsets, and strikes shall be series 1000 and shall conform to BHMA A156.13, operational Grade 1. Strikes for security doors shall be rectangular without curved lip. Mortise type locks and latches for doors 1-3/4 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door. Mortise locks shall have armored fronts.

2.4.2 Lock Cylinders (Mortise)

Lock cylinders shall comply with BHMA A156.5. Lock cylinder shall have not less than seven pins. Cylinders shall have key removable type cores. A grand master keying system shall be provided. All locksets, and exit devices shall accept same interchangeable cores. Use Best Lock Corporation for compatibility with existing base system.

2.4.3 Lock Trim

Lock trim shall be cast, forged, or heavy wrought construction of commercial plain design. In addition to meeting the test requirement of BHMA A156.2 or BHMA A156.13,

roses, and escutcheons shall be 0.050 inch thick, if unreinforced. If reinforced, the outer shell shall be 0.035 inch thick and the combined thickness shall be 0.070 inch.

2.5 EXIT DEVICES AND EXIT DEVICE ACCESSORIES

Exit devices and exit device accessories shall conform to BHMA A156.3, Grade 1.

2.5.1 Exit Devices and Auxiliary Items

Trim shall be of wrought construction and commercial plain design with straight, beveled, or smoothly rounded sides, corners, and edges. Adjustable strikes shall be provided for vertical rod devices. Open back strikes shall be provided for pairs of doors with mortise and vertical rod devices; except open back strikes shall be used on labeled doors only where specifically provided for in the published listings. Touch bars shall be provided in lieu of conventional crossbars and arms. Scheduled escutcheons shall be provided not less than 7 by 2-1/4 inches. Escutcheons will be cut to suit cylinders and operating trim.

2.6 KEYING

Locks shall be keyed in sets or subsets as scheduled. Locks shall be furnished with the manufacturer's standard construction key system. Change keys for locks shall be stamped with change number and the inscription "U.S. Property - Do Not Duplicate." Keys shall be supplied as follows:

Locks:	2 change keys each lock.
Master keyed sets:	6 keys each set.
Grand master keys:	4 total.
Construction keys:	6 total.
Blank keys:	12 total.

The keys shall be furnished to the Contracting Officer arranged in a container in sets or subsets as scheduled.

2.7 DOOR CLOSING DEVICES

Door closing devices shall conform to BHMA A156.4, Grade 1. Closing devices shall be products of one manufacturer for each type specified.

2.7.1 Surface Type Closers

Surface type closers shall be Grade 1, Series C02000 Full Cover with options PT-4H, Size 1 or 2 through Size 6, and PT-4D with back check position valve. Except as otherwise specified, sizes shall conform to the manufacturer's published recommendations. Closers for outswinging exterior doors shall have parallel arms or shall be top jamb mounted. Closers for doors close to a wall shall be of narrow projection so as not to strike the wall at the 90-degree open position. Closers on doors accessible to the physically handicapped shall have the closing force set for a push-pull of 5 pounds applied at the knob or handle for interior doors; for exterior doors, set to the minimum required to relatch the door.

2.8 ARCHITECTURAL DOOR TRIM

Architectural door trim shall conform to BHMA A156.6.

2.8.1 Door Protection Plates

2.8.1.1 Armor Plates

Armor plates shall be category J100, stainless steel, 36 inches in height, and 2 inches less in width than the width of the door for single doors and 1 inch less for pairs of doors. Edges of metal plates shall be beveled.

2.8.1.2 Kick Plates

Kick plates shall be Category J100, stainless steel. Width of plates shall be 2 inches less than door width for single doors and 1 inch less for pairs of doors. Height shall be 16 inches. Edges of plates shall be beveled.

2.9 AUXILIARY HARDWARE

Auxiliary hardware, consisting of dust-proof strikes and door stops, shall conform to BHMA A156.16. Dust-proof strikes shall be Type L04011 for doors that are not fire rated. Dust-proof strikes shall be Type L04021 for fire rated doors.

2.10 MISCELLANEOUS

2.10.1 Metal Thresholds

Thresholds shall conform to BHMA A156.21. Thresholds for exterior doors shall be extruded aluminum of the type indicated and shall provide proper clearance and an effective seal with specified weather stripping. Where required, thresholds shall be modified to receive projecting bolts of exit devices. Thresholds for doors accessible to the handicapped shall be beveled with slopes not exceeding 1:2 and with heights not exceeding 1/2 inch. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.10.2 Rain Drips

Extruded aluminum, not less than 0.07 inch thick, mill finished. Overhead rain drips shall be approximately 1-1/2

inches high by 2-1/2 inches projection and shall extend 2 inches on either side of the door opening width.

2.10.3 Aluminum Housed Type Weatherseals

Weatherseals of the type indicated on drawings shall consist of extruded aluminum retainers not less than 0.07 inch wall thickness with vinyl, neoprene, silicone rubber, polyurethane or vinyl brush inserts. Aluminum shall be clear (natural) anodized. Weatherseal material shall be of an industrial/commercial grade. Seals shall remain functional through all weather and temperature conditions. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.10.4 Gasketing

Gasketing shall be a compression type seal, silicon based, self-adhesive product for use on steel door frames with wood or steel doors for 20-minute. Color shall be bronze. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.11 FASTENINGS

Fastenings of proper type, size, quantity, and finish shall be supplied with each article of hardware. Machine screws and expansion shields shall be used for attaching hardware to concrete or masonry. Fastenings exposed to the weather in the finished work shall be of brass, bronze, or stainless steel. Sex bolts, through bolts, or machine screws and grommet nuts, where used on reverse-bevel exterior doors, shall employ one-way screws or other approved tamperproof screws.

2.12 FINISHES

Unless otherwise specified, finishes shall conform to those identified in BHMA A156.18. Where painting of primed surfaces is required, painting is specified in Section 09900 PAINTING, GENERAL.

2.13 HARDWARE FOR FIRE DOORS

Hardware for fire doors shall conform to the requirements of NFPA 80 and NFPA 101.

PART 3 - EXECUTION

3.1 APPLICATION

Hardware shall be located in accordance with DHI-04 and DHI-05. When approved, slight variations in locations or dimensions will be permitted. Application shall be in accordance with DHI-02 or DHI A115-W. Door control devices for exterior doors such as closers and holders, shall normally attach to doors with thru bolts and nuts or sex bolts. Electric hardware items and access control devices shall be installed in accordance with manufacturer's printed installation procedures.

3.1.1 Hardware for Fire Doors and Smoke-Control Door Assemblies

Hardware for fire doors shall be installed in accordance with the requirements of NFPA 80. Exit devices installed on fire doors shall have a visible label bearing the marking "Fire Exit Hardware". Other hardware installed on fire doors, such as locksets, closers, and hinges shall have a visible label or stamp indicating that the hardware items have been approved by an approved testing agency for installation on fire-rated doors. Hardware for smoke-control door assemblies shall be installed in accordance with NFPA 105.

3.1.2 Door-Closing Devices

Door-closing devices shall be installed and adjusted in accordance with the templates and printed instructions supplied by the manufacturer of the devices. Insofar as practicable, doors opening to or from halls and corridors shall have the closer mounted on the room side of the door.

3.1.3 Kick Plates

Kick plates shall be installed on the push side of single-acting doors and on both sides of double-acting doors.

3.1.4 Auxiliary Hardware

Lever extension flush bolts shall be installed at the top and bottom of the inactive leaf of pairs of doors. The bottom bolt shall operate into a dust-proof floor strike or threshold.

3.1.5 Thresholds

Thresholds shall be secured with a minimum of 3 fasteners per single door width and 6 fasteners per double door width with a maximum spacing of 12 inches. Exterior thresholds shall be installed in a bed of sealant with expansion anchors and stainless steel screws. Minimum screw size shall be No. 10 length, dependent on job conditions, with a minimum of 3/4-inch thread engagement into the floor or anchoring device used. Thresholds shall have ends scribed neatly to jambs.

3.1.6 Rain Drips

Overhead rain drips shall align with bottom edge of door frame rabbet. Drips shall be set in sealant and fastened with stainless steel screws.

3.1.7 Weatherseals

Weatherseals shall be located as indicated, snug to door face and fastened in place with color matched metal screws after door and frames have been finish painted. Screw spacing shall be as recommended by manufacturer.

3.1.8 Gasketing

Gasketing shall be installed at the inside edge of the hinge and head and latch sides of door frame. Frames shall be toleranced for a 1/8 inch clearance between door and frame. Frames shall be treated with tape primer prior to installation.

3.2 OPERATIONAL TESTS

Prior to acceptance of any electrical hardware system, an operational test shall be performed to determine if devices are operating as intended by the specifications. Wiring shall be tested for correct voltage, current carrying capacity, and proper grounding. Stray voltages in wiring shall be eliminated to prevent locking devices from releasing in critical situations.

3.3 HARDWARE SETS

HW-1

1-1/2 pr.	Hinges, A8112
1	Lockset, F04
1	Closer, C02021
1	Wall Stop, L02251

1 set	Gasketing

HW-2

1-1/2 pr.	Hinges, A8112
1	Latchset F01
1	Closer, C02011
1	Wall Stop, L02251
1 set	Gasketing

HW-3

3 pr.	Hinges, A8112
1	Lockset, F13
1	Cylinder, E16081
2	Flush Bolts, L04081
1	Dustproof Strike, L04011
2	Armor Plate, J101
2	Floor Stop, L01371
2	Closer, C02021
1	Astragal Seal, by door assembly manufacturer
1	Threshold, J601
1	Raindrip
2 sets including bottom sweep	Weatherstripping

HW-4

1-1/2 pr.	Hinges, A8112
1	Exit Device, Type 6 with Alarm; Function 01 (exit only, no trim)
1	Closer, C02021
1	Floor Stop, L01371
1	Threshold, J601
1	Raindrip
1 set including bottom sweep	Weatherstripping

W-5 Hardware for Aluminum Doors by Aluminum Door Manufacturer

1	Cylinder Lock, E8223

HW-6

1-1/2 pr.	Hinges, A8112
1	Lockset, F04
1	Closer, C02011
1	Wall Stop, L02251
1 set	Gasketing

HW-7

1-1/2 pr.	Hinges, A8112
1	Latchset, F01
1	Closer, CO2021
1	Wall Stop, L02251
1 set	Gasketing

HW-8

1-1/2 pr.	Hinges, A8112
1	Lockset, F04
1	Closer, C02011
1 set	Gasketing

HW-9

1-1/2 pr.	Hinges, A8112
1	Latchset, F01
1	Closer, C02011

HW-10

1-1/2 pr.	Hinges, A8112
1	Lockset, F22
1	Wall Stop, L02251

HW-11

1-1/2 pr.	Hinges, A8112
1	Lockset, F04
1	Closer, C02011
1	Wall Stop, L02251

HW-12

1-1/2 pr.	Hinges, A8112
1	Latchset, F01
1	Closer, C02011
1	Wall Stop, L02251

HW-13

3 pr. Hinges, A8112	
2	Exit Device, Type 7 (labeled assembled), Function 08 (lever latchset entrance)
2	Closer, C02011
1	Wall Stop, L02251
1 set	Gasketing
1	Astragal/Meeting Stile Gasketing (labeled assembly)

HW-14

3 pr. Hinges, A8112	
2	Exit Device, Type 7 (labeled assembled), Function 08 (lever latchset entrance)
2	Closer, C02011
1 set	Gasketing
1	Astragal/Meeting Stile Gasketing (labeled assembly)

HW-15

1-1/2 pr.	Hinges, A8112
1	Lockset, F07
1	Closer, C02021
1	Floor Stop, L01371
1	Threshold, J601
1	Raindrip
1 set	Weatherstripping, including bottom sweep

HW-16

1-1/2 pr.	Hinges, A8112
1	Lockset, F04
1	Closer, C02011

HW-17

1-1/2 pr.	Hinges, A8112
1	Latchset, F01
1	Closer, C02021

HW-18

1-1/2 pr.	Hinges, A8112
1	Lockset, F04
1	Closer, C02011
1	Floor Stop, L02141
1 set	Gasketing

HW-19

1-1/2 pr.	Hinges, A8112
1	Latchset, F01
1	Closer, C02011
1	Wall Stop, L02251
1	Kick Plate, J102
1 set	Gasketing

HW-20

1-1/2 pr.	Hinges, A8112
1	Lockset, F04
1	Closer, C02011
1	Wall Stop, L02251
1	Armor Plate, J101
1 set	Gasketing

HW-21

1-1/2 pr.	Hinges, A8112
1	Five Bottom Cipher Lock with Lever Arm
1	Exit Device, Type 1 (labeled assembly)
1	Closer, C02021
1	Wall Stop, L02251
1 set	Gasketing

HW-22

3 pr.	Hinges, A8112
2	Exit Device, Type 7 (labeled assembly) Function 01 (exit only, no trim)
1	Closer, C02021 (Room 215 side mounting)
1	Closer, C02011 (Room 215 side mounting)
2	Wall Stop, L02251
2 sets	Gasketing

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SECTION 08810 - GLASS AND GLAZING

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 864	(1990) Dense Elastomeric Seal Gaskets, Setting Blocks and Spacers
ASTM C 920	(1987) Elastomeric Joint Sealants
ASTM C 1036	(1991) Flat Glass
ASTM C 1048	(1992) Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
ASTM D 395	(1989) Rubber Property - Compression Set

CODE OF FEDERAL REGULATIONS (CFR)

16 CFR 1201	Safety Standard for Architectural Glazing Materials

FEDERAL SPECIFICATIONS (FS)

FS DD-M-411	(Rev C) Mirrors, Glass

FLAT GLASS MARKETING ASSOCIATION (FGMA)

FGMA-01	(1990) Glazing Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-01 Data\

Glass\; *FIO*\.

Glazing Accessories\; *FIO*\.

Manufacturer's descriptive product data, handling and storage recommendations, installation instructions, and cleaning instructions.

SD-04 Drawings\

Glazing Materials and Accessories\; *FIO*\

Drawings showing complete details of the proposed setting methods, mullion details, edge blocking, size of openings, frame details, materials, and types and thickness of glass.

SD-13 Certificates\

Glass\; *FIO*\.

Certificates stating that the glass meets the specified requirements. Labels or marking affixed to the glass will be accepted in lieu of certificates.

SD-14 Samples\

Glass\; *GA*\.

Two 8 x 10 inch samples of each of the following: tinted (light-reducing) glass, tempered glass and wired glass.

1.3 SYSTEM DESCRIPTION

Glazing systems shall be fabricated and installed watertight and airtight to withstand thermal movement and wind loading without glass breakage, gasket failure, deterioration of glazing accessories, and defects in the work.

1.4 DELIVERY, STORAGE AND HANDLING

Glazing compounds shall be delivered to the site in the manufacturer's unopened containers. Glass shall be stored indoors in a safe, well ventilated dry location in accordance with manufacturer's instructions, and shall not be unpacked until needed for installation. Glass shall not be stored on site over 1 month.

1.5 PROJECT/SITE CONDITIONS

Glazing work shall not be started until outdoor temperature is above 40 degrees F and rising, unless procedures recommended by glass manufacturer and approved by Contracting Officer are made to warm the glass and rabbet surfaces. Ventilation shall be provided to prevent condensation of moisture on glazing work during installation. Glazing work shall not be performed during damp or raining weather.

PART 2 - PRODUCTS

2.1 FLOAT GLASS

2.1.1 Tinted (Light-Reducing) Glass

Tinted (light-reducing) glass shall be Type I transparent flat type, Class 3-tinted, Quality q3 - glazing select 37 percent light transmittance, 54 percent shading coefficient, conforming to ASTM C 1036. Color shall be gray.

2.2 HEAT-TREATED GLASS

Heat-treated glass shall conform to the following requirements.

2.2.1 Tempered Glass

Tempered glass shall be kind FT fully tempered transparent flat type, Class 1-clear, Condition A uncoated surface, Quality q3 - glazing select, 100 percent light transmittance, 0 percent shading coefficient conforming to ASTM C 1048. Color shall be clear.

2.3 ROLLED GLASS

2.3.1 **Wired Glass**

Wired glass shall be Type II flat type, Class 1 - translucent, Quality q7 - decorative, Form 1 - wired and polished both sides, conforming to ASTM C 1036. Wire mesh shall be polished stainless steel Mesh 2 - square. Wired glass for fire-rated windows shall bear an identifying UL label or the label of a nationally recognized testing agency, and shall be rated for 20 minutes when tested in accordance with ASTM E 163. Wired glass for fire-rated doors shall be tested as part of a door assembly in accordance with ASTM E 152. Color shall be clear.

2.4 MIRRORS

2.4.1 Glass Mirrors

Glass for mirrors shall be Type I transparent flat type, Class, 1-clear Glazing Quality q1 1/4 inch thick conforming to ASTM C 1036. Glass color shall be clear. Glass shall be coated with silver coating, copper protective coating, and mirror backing paint conforming to FS DD-M-411. Silver coating shall be highly adhesive pure silver coating of a thickness which shall provide reflectivity of 83 percent or more of incident light when viewed through 1/4 inch thick glass, free of pinholes or other defects. Copper protective coating shall be pure bright reflective copper, homogeneous without sludge, pinholes or other defects, and shall be of proper thickness to prevent "adhesion pull" by mirror backing paint. Mirror backing paint shall consist of two coats of special scratch and abrasion-resistant paint applied, and shall be baked in uniform thickness

to provide a protection for silver and copper coatings which will permit normal cutting and edge fabrication.

2.4.2 Mirror Accessories

2.4.2.1 Mirror Frames

Mirrors shall be provided with mirror frames (J-mold channels) fabricated of one-piece roll-formed Type 304 stainless steel with No. 4 brushed satin finish and concealed fasteners which will keep mirrors snug to wall. Frames shall be 1-1/4 x 1/4 x 1/4 inch continuous at top and bottom of mirrors. Concealed fasteners of type to suit wall construction material shall be provided with mirror frames.

2.5 GLAZING ACCESSORIES

2.5.1 Sealant

Sealant shall be elastomeric conforming to ASTM C 920, Type S or M, Grade NS, Class 12.5, Use G, of type chemically compatible with setting blocks. Color of sealant shall be black.

2.5.1.1 Aluminum Framing Glazing Gaskets

Glazing gaskets for aluminum framing shall be permanent, elastic, non-shrinking, non-migrating, watertight and weathertight.

2.5.2 Setting and Edge Blocking

Neoprene setting blocks shall be dense extruded type conforming to ASTM D 395, Method B, Shore A durometer between 70 and 90. Edge blocking shall be Shore A durometer of 50 (+ or - 5). Silicone setting blocks shall be required when blocks are in contact with silicone sealant. Profiles, lengths and locations shall be as required and recommended in writing by glass manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

Openings and framing systems scheduled to receive glass shall be examined for compliance with approved shop drawings, FGMA-01 and glass manufacturer's recommendations including size, squareness, offsets at corners, presence and function of weep system, face and edge clearance requirements and effective sealing between joints of glass-framing members. Detrimental materials shall be removed from glazing rabbet and glass surfaces and wiped dry with solvent. Glazing surfaces shall be dry and free of frost.

3.2 INSTALLATION

Glass and glazing work shall be performed in accordance with approved shop drawings, FGMA-01, glass manufacturer's instructions and warranty requirements. Glass shall be installed with factory labels intact and removed only when instructed. Wired glass shall be installed in accordance with NFPA 80. Edges and corners shall not be ground, nipped or

cut after leaving factory. Springing, forcing or twisting of units during installation will not be permitted.

3.3 CLEANING

Upon completion of project, outside surfaces of glass shall be washed clean and the inside surfaces of glass shall be washed and polished in accordance with glass manufacturer's recommendations.

3.4 PROTECTION

Glass work shall be protected immediately after installation. Glazed openings shall be identified with suitable warning tapes, cloth or paper flags, attached with non-staining adhesives. Glass units which are broken, chipped, cracked, abraded, or otherwise damaged during construction activities shall be removed and replaced with new units.